Exhibit GG

June 3, 1985

MEMORANDUM

TO: MR. SHERIFF

FROM: JIM DARDEN JP

SUBJECT: MAXINE RECLAMATION

Please find attached a copy of the report prepared by Dr.Pettry and myself concerning the Maxine Mine (abandoned area) Reclamation and Water Quality. The report was presented to Mr. Adair and subsequently to the Southern Company, Gulf and Alabama Power Companies on Friday, May 31, 1985. The Southern Company officials concurred with the report and authorized the reclamation.

Please review the report and disseminate to your staff as you see fit. I welcome your comments concerning the approach and look forward to working with Messrs. Musick, Walker, McDuff or others as you deem appropriate.

Mr. Bowers and I will take the lead role in lining up contractors, material, etc., if this meets with your approval. We hope to begin work not later than June 17, 1985.

JWD:rl
Attachment

cc: Mr. Adair
Mr. Burdette
Mr. Musick
Mr. Walker
Mr. Bowers
Mr. McDuff, Jack
Mr. Curtis Jones/Mr. Fred McDuff
Mr. Edwards

PLAINTIFF'S EXHIBIT 40 Muncher
PENGAD 800-631-6989

RECLAMATION PLAN FOR PRE-LAW REFUSE DISPOSAL AREA OF MAXINE MINE AND IMPACTS ON WATER QUALITY

Prepared By

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EXECUTIVE SUMMARY

The 34 acre pre-law spoil disposal area of Maxine mine was evaluated for reclamation and stabilization. The spoil originated from the Maxine mine coal preparation plant and it had been deposited prior to 1977. The spoil area is extremely acid, lacks vegetative cover, and is actively eroding. An extensive gulley system is becoming entrenched in the spoil.

The disposal area has a surface area greater than 1,481,040 square feet for contact with precipitation and subsequent acidification to occur. The 34 acre watershed comprised by the spoil drains directly into the water emitted from the mine area which requires treatment. Runoff waters from the spoil have a severe detrimental impact to water quality by making major contributions to acid pH levels, and high levels of sulfate, iron, manganese and suspended solids. Acidic sediment erodes from the unstabilized spoil directly into the drainage system.

A reclamation plan is proposed to stabilize the spoil area consisting of four phases and based upon knowledge gained in recent work at the site. The phases are as follows:

I. Site preparation and chemical amelioration

II. Seedbed preparation, chemical beneficiation and planting

III. Planting pine trees

IV. Spot treatment of "hot spots" and fertilization

Proposals are also made to ameliorate acidic drainage conditions and improve water quality.

Chemical and vegetative reclamation of the spoil would stabilize the area against continued erosion and sediment emission, prevent acidification of surface waters, and improve quality of runoff waters and the immediate ecological system. Reclamation would also have a major aesthetic impact to the total mine area.

INTRODUCTION

Reclamation of post-law mine refuse areas in conjunction with closure of the Maxine underground mine has focused attention on the bare, eroding pre-law disposal area and raised questions concerning its contribution to stream degradation. This report addresses the nature of the spoil materials and the potential impacts to water quality. A reclamation plan is proposed based on knowledge gained in current and past reclamation activities at the Maxine Mine. The site and materials have been studied for the past two years as background for this report.

NATURE OF THE AREA

The pre-law mine spoil disposal area comprises an area of about 34 acres. The topography consists of a backslope, flat area, and steeply sloping lower outer face. The spoil materials are dominantly black (10YR 2/1), very dark gray (10YR 3/1), and dark gray (10YR 4/1) partially weathered shale and sandstone coarse fragments with scattered carbonaceous fines. The more highly weathered areas on the flat topography exhibit some yellow-brown and yellowish-gray colors (Photo 1). The coarse fragment (>2 mm) content ranges from about 40 to 70% and varies in size from 2 mm to 6 inches diameter (Photo 2). A large proportion of the material is in the 2 to 10 mm diameter range.

Finer textures of higher clay and silt contents occur in isolated "pockets" on the more level areas where greater weathering and less erosion have occurred. The spoil is somewhat compacted near the surface reflecting previous machine compaction and rainfall impact with no protective vegetative cover. The surface tends to be plated with coarse fragments due to erosion and leaching of fines by water action at the surface. The dark color of the spoil is conducive to build-up of high surface temperatures in the summer months which tend to create droughty conditions.

A few isolated depressions in the flatter topography were observed to have perched water tables during the winter months of 1985 at depths of 15 to 20 inches. The restricted subsurface permeability in these areas is due to the accumulation of fines

which have filled interstices. Such conditions may represent a temporary stage of weathering and subsurface movement of labile components in the spoil. No water table was detected in auger holes to a depth of 72 inches immediately adjacent to the small (10-15 yards diameter) circular depressions which suggests the wet areas are very local in nature. The free-water represents isolated perching of water near the upper surface of the fill materials that does not extend throughout the matrix of the spoil.

Table 1. pH and Potential Acidity of Representative Spoil After Oxidation with H_2O_2.

Sample	pH	After H_2O_2 Treatment pH	pH
Backslope 0-6"	3.3	2.8	-0.5
Backslope 6-12"	3.4	2.8	-0.6
Flat Area 0-6"	3.3	2.6	-0.7
Flat Area 6-10"	3.3	2.8	-0.5
Flat Area 10-15"	3.3	2.8	-0.5
Lower Slope 0-6"	3.4	2.7	-0.7
Lower Slope 0-4	2.3	2.0	-0.3
Lower Slope 4-10	2.3	2.4	-0.1
Gulley top, lower slope	3.5	2.5	-1.0
Gulley side, lower slope	3.6	2.9	-0.7
Undisturbed soil on slope below fill	5.8	5.3	-0.5

The spoil materials are extremely acid with pH levels ranging from 3.6 to 2.3. The pH levels are similar to values previously obtained for spoil from the Maxine mine deposited in other locations. The differences in pH levels after oxidation with H_2O_2 reflect the potential acidity remaining to be

weathered. The pH levels decreased from 0.1 to 0.7 pH units indicating the weathered spoil exposed to air has undergone extensive weathering. In comparison, fresh spoil from the Maxine mine had a pH level of 6.3 after 12 hours exposure to the air (previous determination when the mine was operating) and decreased to 2.9 after H_2O_2 oxidation. The extremely low pH levels are toxic to most plants and reflect the oxidation and subsequent hydrolyzing of the pyritic (FeS_2) components in the spoil. The acidification reaction occurring when the spoil, which contains pyrite, is exposed to air and water may be expressed as follows:

$$2FeS_2+7\frac{1}{2}O_2+7H_2O \longrightarrow 2Fe(OH)_3+4H_2SO_4$$

The ferrous iron (Fe^{++}) is oxidized upon exposure to the air and subsequently hydrolyzed by contact with water to Fe $(OH)_3$ with production of acidity (H_2SO_4). Pyrites present in the spoil are usually oxidized naturally by both chemical and biological reactions. Based on similarly low pH levels with increasing depth, it appears the bulk of the upper spoil area has weathered to a similar degree. Much of the pyritic materials appear to have weathered to acidic sulfur compounds which results in the very acid status.

DISPOSAL AREA EFFECTS ON WATER QUALITY

The pre-law rock disposal area has an effective watershed area of about 34 acres (1,481,040 square feet). Incoming precipitation is drastically affected by contact with the acidic materials by overland flow and seepage through the refuse materials. The precipitation readily reacts with acidic reaction products of the weathered rock waste resulting in immediate acidification of the water coming in contact with the materials. The resultant waters containing sulphuric acid (H_2SO_4) attain the extremely acidic pH levels of the refuse before entering the drainage system. The pH levels along the drainage system exiting the area clearly reflect the impact of the refuse area (Figure 1). The effective surface contact area is considerably larger than 34 acres due to entrenched gullies eroded into the refuse and slopes which present greater spoil surface for reaction to occur.

The refuse area is essentially bare of surface vegetation except for scattered small pine trees which have become established naturally (Photo 3). The bare surface presents an area greater than one million square feet for rainfall impact and resultant detachment and transport of acidic sediment from the site. Gullies are actively entrenching into the spoil and developing an extensive gulley system on the steeper, lower slopes towards the base of the fill (Photo 4). The gullies have eroded to depths of 7 feet and greater in places and the erosion will continue unless checked by stabilizing the site (Photos 5, 6).

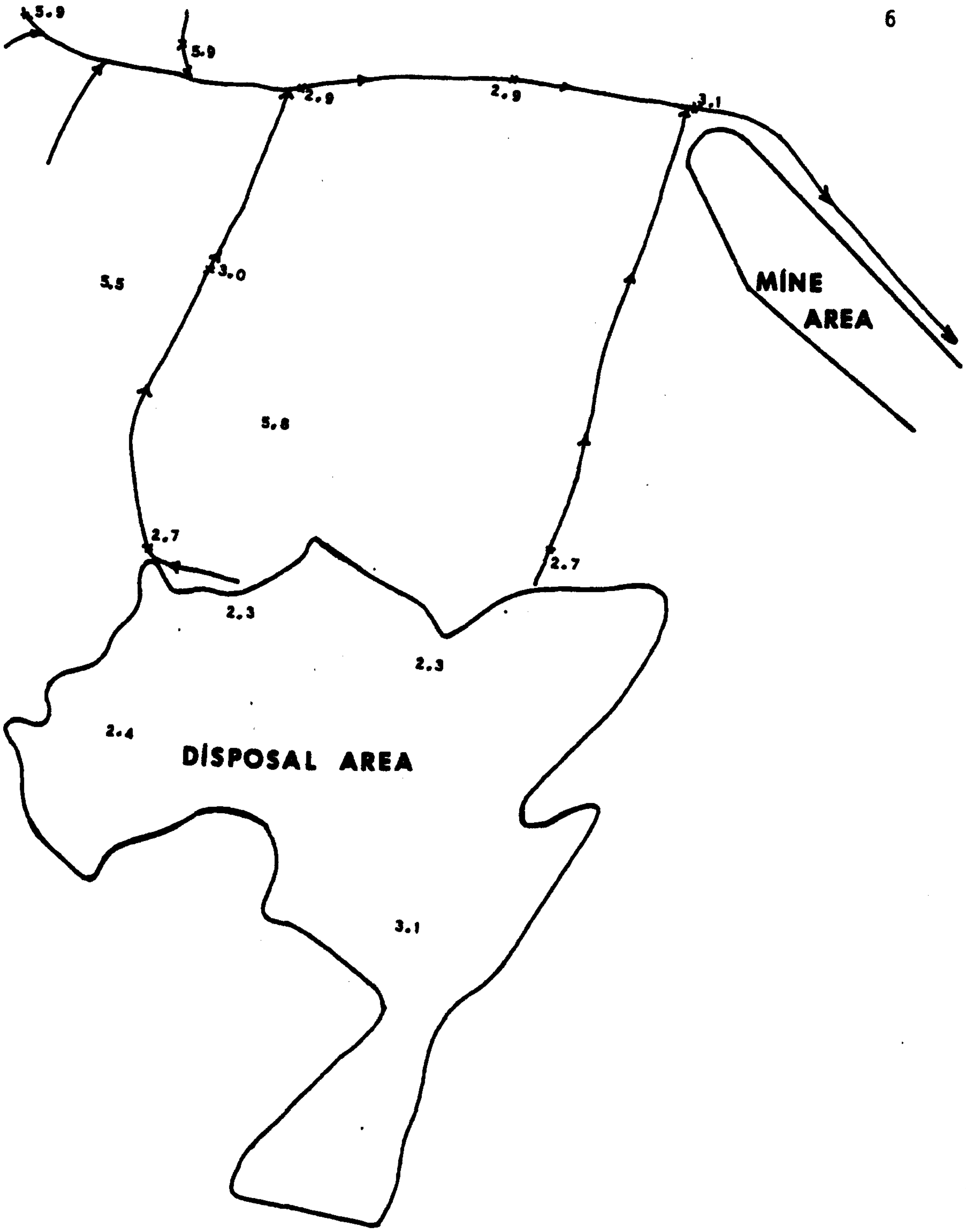

Figure 1. pH Levels of Spoil, Natural Wooded Areas and Drainage Waters Showing Detrimental Impact of Spoil to Water Quality.

The acidic sediment has lined the drainage channels draining the Maxine Mine giving rise to further emission. The runoff waters have considerable velocity during periods of intense rainfall which has immediate effects on the fluctuation in base flow of the drainage system. The water retention time for incoming precipitation does not appear to be very long in duration based on observations during and following rainfall events. Relatively little discharge has been observed coming from the disposal area during dry periods.

The baseflow stream chemistry leaving the Maxine Mine area appears to be controlled by the combination of ground water inputs from the Pottsville Formation and runoff and seepage through the acidic rock disposal material and reclaimed areas in the watershed. Waters leaving the rock disposal area have a profound impact on stream quality as shown in Table 2. The pH of drainage waters in the natural wooded area adjacent to the disposal site ranges from 5.96 to 6.16 with trace quantities of iron and manganese, and low sulfate contents ranging from 20 to 35 mg/l. Water at the edge of the natural area and the disposal area reflect the mixing and detrimental impact of the acidic spoil with pH levels decreasing to 4.04 and sulfate contents increasing to 93 mg/l. Waters draining from the spoil have pH levels ranging from 2.68 to 2.84 and they contain 64-490 mg/l iron, 17-53 mg/l manganese, and 1,768 - 5,983 mg/l sulfate, respectively. The detrimental impact to stream quality is clearly shown in Table 2, after disposal area drainage had

Table 2. Chemical Characteristics of Surface Discharge Waters Collected in Natural Wooded Areas Adjacent to the Disposal Area and Within the Disposal Area on April 14, 1984.†

Location	pH	Total Iron	Total Manganese	Total Suspended* Solids	Sulfate
Natural Area	5.96	0.02	<0.1	16	35
Natural Area	5.98	<0.01	<0.1	49	22
Natural Area	6.16	<0.01	<0.1	12	20
Edge of Natural Area - and Disposal Site	4.04	0.04	1.3	1	93
Disposal Site	2.68	490	53	102	5,983
Disposal Site	2.76	92	20	3	2,293
Disposal Site	2.73	410	22	1	4,129
Disposal Site	2.84	64	17	7	1,768
Disposal Site	2.81	78	18	6	2,037
Bottom Disposal Site - Entering Drain	2.81	78	14	56	1,599

* HCl was added to redissolve Fe that had precipitated in collection bottles, which affects suspended solids data.

† Analyzed by ABC Laboratory.

entered the system the pH level was 2.81 with higher iron and manganese levels and 1,599 mg/l sulfate. For comparative purposes, researchers (Bieseker and George, 1966) reported that surface runoff waters from nine mines in Appalachia had a pH range of 2.5 to 7.8 with the majority occurring in the 2.5 to 3.0 range. Soluble iron concentrations ranged from 2.8 to 217 ppm, and soluble manganese concentrations varied from 2.2 to 9 ppm.

The surface waters in the natural wooded areas appear to have pH levels of 5.8 to 6.1 with very low levels of iron, manganese and sulfate. The natural precipitation may be somewhat acidic (<pH7), and the precipitation throughfall and interaction with vegetation results in some acidification of the poorly buffered stream during runoff periods. The soils adjoining the disposal area were mapped as Montevallo-Nauvoo Association, Steep (Spivey, 1982). They developed in sandstone and shale and are strongly to very strongly acid. Hence, the acid soils also contribute to the acidic nature of the natural surface runoff. Direct emission to the drainage system from exposed Pottsville Formation outcrops in the watershed may also contribute to the acidity of surface drainage. Recent research on acidification of streams in Pennsylvania (Sharpe et al., 1984) indicated very acidic water emerged naturally from the Pottsville rock formations resulting in low pH levels. It appears likely that surface drainage in the Maxine area before disturbance due to mining activities may have had pH levels of

5.5 to 6, with very low levels of iron, manganese and relatively low sulfate levels.

Without corrective stabilization, it appears that accelerated erosion and gulley development will continue to erode into the refuse material cutting deeper gullies with the "nickpoint" moving progressively up slope. Such actions increase the surface area for acidification reactions to occur between the spoil and precipitation, and increase the sediment detachment and emission. Under these conditions, acidity, iron, manganese, sulfate and sediment emissions of a severe impact nature will continue for the foreseeable future and require continued water treatment.

Although non-point seepage and emission from the spoil is evident in places, most of the discharge from the refuse area occurs along well-defined channels. As shown in Photo 8, a defined channel at the bottom of the spoil directs runoff and seepage from the site. Much of the channelized flow exits through the culvert shown in Photo 9 into the drainage of the natural wooded area. However, a large trash dump extends along the outer slope and lies in the path of the outflowing drainage (Photo 10). The trash is located directly in the path of the drainage waters from the culvert. The solid waste comprises a considerable volume and has a heterogeneous composition of metals, plastics, paper, chemicals and containers of unknown content (Photo 10). Contact of the exiting acidic waters with the trash may result in numerous compounds detrimental to

water quality, including iron and other metallic reaction products and possibly chloronated hydrocarbons. The trash represents a concentrated reservoir of metallic components for entry into the drainage water and subsequent degradation of water quality. Trash was being deposited at the dump as recently as April, 1985, apparently from residences in the vicinity.

RECLAMATION POTENTIAL

Presently, the spoil area represents a very harsh environment for vegetative establishment due to the extremely aciditic conditions which are toxic to most plants, low fertility and hot, droughty nature. However, scattered pine have become established, primarily on the lower slopes where pH levels are slightly higher due to erosion of the finer particles (Photo 4). Although the pine trees appear to be surviving, they have not curtailed the erosion which is actively creating gullies in their presence. A marked absence of other plant types is a conspicuous feature of the site. The black spoil absorbs heat during summer months and experiences a significant heat build-up which is harmful to plants and increases water evaporative losses.

Chemical analysis indicates the spoil contains more than 30 m.e./100g acidity accompanied by elevated levels of aluminum and low contents of calcium, magnesium, potassium and phosphorus. Clay and silt sized particle contents are higher in the flatter topographic positions where less erosion has occurred. The finer sized particles have greater water-holding capacities than the coarser particles as well as greater cation exchange capacities. It is prudent to retain the finer sized particles from losses due to erosion. Erosion is a significant problem in reclaiming mine areas (Rubio-Montoya, 1984), and erosion control is critical to retain fines and reduce sediment emission.

Recent literature (Draper, 1984) indicates successful direct vegetation of acidic deep coal mine refuse was accomplished on a demonstration basis for the Warwick mine coal preparation refuse disposal site in Greene County, Pennsylvania. Current reclamation efforts underway for the Maxine mine washing plant and barge loading area are utilizing mine spoil as an alternative soil material. The knowledge gained in the reclamation efforts at Maxine serve as the foundation for evaluation of the Maxine spoil for establishment of permanent vegetative cover. Pot studies of the spoil and current efforts indicate the feasibility of ameliorating the spoil materials chemically and adapting a prescription vegetative reclamation effort.

When the reclamation program was installed during the late summer and fall of 1984 at the lower Maxine area (washer plant area) a very small plot was prepared in the pre-law area for evaluation purposes by ABC personnel. Preparation of the area and application of amendments and seeding methods only approximated the reclamation efforts at the bottom site. Evaluations of the plot in April, 1985 indicated a partial stand of fescue had survived the winter and was growing (Photo 11). The surviving fescue was growing in depressed rills created by discing and little was noted between rills. The pH levels in the plot were very erratic and ranged from 3.2 to 6.5 indicating irregular distribution and incorporation of $Ca(OH)_2$ and lime. The lime and plant nutrients had tended to accumulate in the rills with finer particles of spoil. Moisture conditions were also more

favorable in the rills. The fescue had a good root system as shown in Photo 12, with roots penetrating the spoil to the depth of $Ca(OH)_2$ treatment. The grass exhibited no toxicity symptoms and was actively growing. The roots of the fescue stabilized the spoil where they were growing. The germination, winter-survival and growth characteristics of the fescue grass in the partially treated spoil attests to the feasibility of direct vegetative establishment in the material. Pot tests with the spoil material indicate vegetation can be grown when it is properly beneficiated. The establishment and survival of pine trees by natural invasion of the spoil area also reflects the potential suitability of the material.

PROPOSED RECLAMATION METHODOLOGY

Based upon analyses and evaluation of the spoil materials, the following reclamation methodology and temporal sequence is recommended for consideration. Methodology draws heavily upon practices previously developed for reclamation areas of Maxine.

PHASE	I ⟶	II ⟶	⟶ III	⟶ IV
ACTIVITY	Site Preparation Chemical Amelioration	Prepare Seedbed Add Amendments Plant & Mulch	Plant Pine Trees	Treat Hot Spots
MONTH	June-July-August	September	February	March-April

PHASE I

The area should be disced perpendicular to the slope on the contour to an effective depth of 6-8 inches. Gullies need to be filled with as little disturbance as possible to the site. It may be desirable to haul in material to fill the larger gullies with consideration given to stone and soil materials. Smaller gullies can be smoothed by pushing material with a blade. Following site preparation, three tons per acre of Ca(OH) should be applied and disced in perpendicular to the slope, followed by another application of 2 tons per acre of $Ca(OH)_2$. Small terraces should be constructed on the sloping areas with a fire plow to reduce overland flow velocity. The area should

then be mulched with hay (3000 lbs/acre). The mulch will serve as a retardant to soil erosion. The addition of hay also serves to increase the number of microorganisms, enzyme activity and fungal genera in spoil materials as well as provide an available carbon source and aid in moisture retention (Lindemann et al., 1984). The $Ca(OH)_2$ should react for several weeks before commencing Phase II.

PHASE II

Apply three tons per acre dolomitic lime and one ton per acre of basic slag, and disc in perpendicular to the slope. Apply one ton per acre dolomitic lime, one ton basic slag, and 500 pounds per acre 13-13-13 fertilizer and disc in perpendicular to the slope. Broadcast 60 pounds per acre KY 131 fescue and 15 pounds per acre Kenland red clover (inoculated) by applying half of the seeds in perpendicular directions, and harrow or drag lightly. Mulch with 3000-4000 pounds per acre hay.

PHASE III

Plant pine trees at the rate of 700 to 900 trees per acre during the optimum planting season. Planting the trees at an early stage of the reclamation will permit the root systems to develop simultaneously in the prepared seedbed and minimize later competition. The grass should form a protective sod to stabilize the site against erosion and retain the weathered fine particles in-situ. The grass will also serve as a

protective cover to buffer the site against extreme heat build-up in summer and frost-heave in winter.

<u>PHASE IV</u>

The occurrence of any "hot spots" of low pH which affect vegetative growth should be treated with appropriate amounts of dolomitic lime and/or basic slag to correct the problem. These areas may need some overseeding. The site should be fertilized with 300 pounds per acre of 13-13-13 fertilizer.

Close on-site supervision of the reclamation activities is critical as well as proper timing of each phase of the operation.

EFFECTS OF RECLAMATION ON WATER QUALITY

The impact of reclamation of the 34 acre spoil area watershed cannot be predetermined with certainty. Stabilizing the site with permanent vegetative cover will dramatically reduce the emission of sediment which contains a large proportion of fine particles that are active chemically. Neutralization of the surface six inches with $Ca(OH)_2$, lime, and basic slag will result in drastic curtailment of the surface acidification reaction on the 1,481,040 square foot area with resultant surface runoff waters leaving the site in a neutral to slightly alkaline condition. The immediate effect of this neutral flow to the drainage at Maxine should serve to dilute and improve the pH levels and lower the sulfate, iron and manganese levels.

In view of the current treatment of water leaving the Maxine mine site and the prospect of continued future treatment to raise pH levels, the proposed improved quality due to reclamation seems of paramount importance both economically and ecologically.

Recent research findings (Brown et al., 1984) reported water quality of revegetated non-topsoiled lignite spoils approached that of undisturbed soils after 15 months. The pH and iron levels soon approached that of the undisturbed area.

CORRECTIVE ACTIONS IN DRAINAGE SYSTEM

Prompt corrective actions to the immediate drainage system emitting from the pre-law spoil area are deemed prudent. It is recommended that the trash dump in the interception area of exiting waters be closed immediately to further dumping. The trash located in the drainage way should be removed, and the area should be treated with $Ca(OH)_2$. Trash located above the direct contact area with drainage waters should be treated with $Ca(OH)_2$, covered with at least 12-18 inches of topsoil and vegetated. It may be as economical and feasible to haul all the refuse off the site to a proper landfill for disposal rather than plate it.

Much of the upper drainage system immediately below the spoil area contains acidic spoil as shown in Photo 9. This acid material serves as a constant source of acidification to

the drainage waters and source of sulfate, iron, and manganese. Fines from the spoil sediment (clay and silt) have tended to armour (coat) sandstone and shale coarse fragments which then serve as a constant source of acid in the drainage waters. Immediately below the drainage culvert in Photo 9, the channel bottom is coated with red iron oxides for some distance where the iron enriched leachate waters have reacted with oxygen and precipitated the iron to an insoluble form. It appears that the red iron oxide coating forms during periods of reduced flow, and the material is periodically purged during peak flows when the water contains a high sediment load.

It is recommended that the acid sediment deposited upstream of the culvert be removed by backhoe or front-end loader and a neutralization interception system be constructed of $Ca(OH)_2$, lime, and limestone. A similar intercept should be prepared at the other main outflow. It is further suggested that the drain at the bottom of the spoil as shown in Photo 8 be lined with limestone coarse fragments to reduce flow velocity and neutralize acidity.

PROPOSED BUDGET

PHASE	TIMEFRAME	COST*
I - SITE PREPARATION - Disc, fill gullies, cut grooves, apply $Ca(OH)_2$ at 3 T/Ac. and disc, apply $Ca(OH)_2$ at 2 T/Ac. and mulch with 3000 to 3500 lbs. hay/acre. Let react 6 weeks to 2 months.	Begin June-July 1985	$ 29,340
II - AMELIORATION AND PLANTING - Apply 3 T/Ac. dolomitic lime and 1 T/Ac. basic slag and disc. Apply 1 T/Ac. dolomitic lime and 1 ton/Ac. basic slag and 500 lbs./Ac. 13-13-13 fertilizer and disc in. Broadcast 60 lbs./Ac. KY 131 Fescue and 15 lbs./Ac. Kenland Red Clover. Harrow or drag lightly and mulch with 3000 to 4000 lbs. hay/acre.	September 1985	25,500
III - Plant pine trees at rate 700 to 900 trees per acre.	January - February 1986	2,500
IV - Treat and overseed "Hot Spots," and fertilizer with 300 lbs./Ac. 13-13-13 fertilizer.	March - April 1986	1,700
WATER QUALITY OPERATIONS		
Remove and clean up dump. Construct drainage intercept and neutralization systems (2) at primary exit drains. Line bottom channel with limestone riprap. (Summer activity with Phase I)	June 1985	5,200
		$ 64,240
	15% Contingency	9,600
	ABC Land Mgt. Time	10,000
	Consulting Fees	10,000
	TOTAL	$ 93,840

*Costs include labor, materials and equipment

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Photo 1. View of the Flatter Topographic Part of Refuse Area Showing Microrelief and Surface Flow Patterns. The Area Is Bare of Vegetation Except For Volunteer Pine Trees. Note Coarse Fragment Surface Pavement and Brighter Colored Weathered Coarse Fragments.

Photo 2. Shallow Excavation Into Spoil Showing the Mixture of Fines and Coarse Fragments. A Large Proportion of Coarse Fragments Are Less Than Two Inches Diameter.

Photo 3. View of Middle Slope Position of Rock Disposal Area Showing Developing Gullies. Surface is Bare of Vegetation Except for Few Isolated Pine Trees That Have Invaded the Site Naturally. The Gulley System is Progressively Moving Upslope.

Photo 4. Sideview of Midslope Position Showing Extensive Gulley Development Which is Progressively Eroding Deeper and Moving Upslope. Sediment from the Gullies Enters the Drainage System.

Photo 5. Large Gulley on Lower Slope Position Which Has Eroded to Depths of 7 Feet. Note Uniformity of Material in the Banks of the Gulley. Finer Particles Have Been detached and Transported as Sediment to the Drainage System.

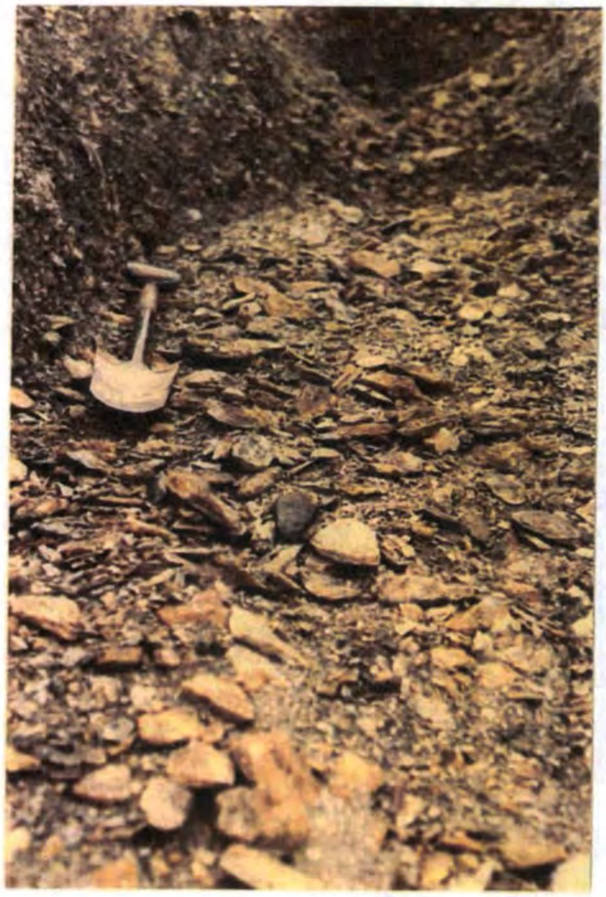

Photo 6. Close-up View of Gulley on Lower Slope Showing the Concentration of Coarse Fragments Remaining After Finer Particles Have Eroded Away and Entered Drainage System. The Largest Coarse Fragments are About Seven Inches in Diameter. Note Iron and Sulfur Compounds Coating Rocks.

Photo 7. View of Bottom Edge of Rock Disposal Area Showing Large Gulley. Inside of Gulley Suggests Previous Combustion Activity. Note Thin Soil-Spoil Mixture and Pine Trees.

Photo 8. Bottom Edge of Disposal Area Showing Gulley Outlets and Drainage Channel that Collects Surface Runoff From Spoil and Seepage. Note Lining of Channel with Acidic Spoil Material and Iron Oxide Coatings.

Photo 9. Drainage Channel Immediately Downslope From Disposal Area Showing Culvert Passing Under Road Constructed of Old Spoil and "Red Dog." Note Accumulation of Acidic Spoil on Bottom of Channel Which Will Move Downslope Into Drainage System. Much of the Surface Flow from the Disposal Area Exits Through This Culvert.

Photo 10. Trash Dump Located Directly in the Path of Water Draining the Disposal Area. Trash Covers Downslope Exit of Culvert. Note Diversity of the Trash Which Serves to Add to Degradation of Stream Quality. Channel Exiting Bottom of Dump is Coated with Red Iron Oxide.

Photo 11. View of Small Plot Located on Disposal Material Showing Fescue Growth in April, 1985. Note Concentration of Grass in the Rills. The Area Was Planted in Early Fall 1984 in Partially Amelioriated Material.

Photo 12. Close-up View of Fescue Clump in Experimental Plot in Spoil. The Fibrous Root System Had Developed to Depth of $Ca(OH)_2$ Incorporation. Note Stabilization of Spoil Material by Fibrous Root System Which Would Prevent Erosion.

June 3, 1985

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